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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,176	01/14/2004	Andrew A. Gubkin	7644-3	4163

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EXAMINER

NGUYEN, PHU K

ART UNIT PAPER NUMBER

2628

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/757,176	<b>Applicant(s)</b> GUBKIN ET AL.	
	<b>Examiner</b> Phu K. Nguyen	<b>Art Unit</b> 2628	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,12,13,16 and 17 is/are rejected.
- 7) ☒ Claim(s) 3,4,9-11,14,15 and 18-23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.


**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**PHU K. NGUYEN**  
**PRIMARY EXAMINER**  
**GROUP 2300**

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/1/05</u> . | 6) <input type="checkbox"/> Other: _____  |

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-8, 12-13, 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by FANG et al. (6,556,199).

As per claim 1, Fang teaches the claimed “method of manipulating a voxel object”, comprising the steps of: “selecting a voxel grid comprising a plurality of voxels” (Fang, figure 1B; the objects with its 3D grid voxel structure); “representing a 3D object in a first voxel space representation comprising at least a portion of said plurality of voxels” (Fang, object 160; column 11, lines 36-47), and “converting said first representation into a second voxel space representation” (Fang, re-voxelization; column 11, lines 48-67), “said second representation defined by a plurality of boundary voxels representing a border of said 3D object, wherein said second representation is exclusive of outer voxels, said outer voxels disposed outside said boundary voxels” (Fang, column 16, lines 6-19, the boundary model for the solid voxel).

Claim 2 adds into claim 1 “the step of compressing said plurality of line segments by eliminating inner voxels of said 3D object, said inner voxels disposed inside said boundary voxels” (Fang, the ray includes only the entering and exiting voxels; column 16, lines 14-19)

Claim 5 adds into claim 1 “said 3D object is an artificial object, further comprising the step of defining attributes of said 3D object using user defined external commands” (Fang, column 1, lines 47-58; the object's attributes are defined through many external sources).

Claim 6 adds into claim 5 “said attributes comprise position, dimensions and color” (Fang, column 5, lines 45-48; column 6, lines 12-15).

Claim 7 adds into claim 2 “the step of displaying an image of said voxel object on a display device directly from said matrix of segments representation, wherein no buffer is used” (Fang, figure 3, the volume renderer 154 directly outputs to the display 156; the processed object is directly displayed without any display or scanned buffer).

Claim 8 adds into claim 1 “the step of storing said first and said second representation in computer memory” (Fang, memories 104, 119; figure 1A).

As per claim 12, Fang teaches the claimed “machine readable storage having stored thereon a computer program for manipulating a voxel object, said computer program comprising a routine set of instructions for causing the machine to perform the steps of”, comprising the steps of: “selecting a voxel grid comprising a plurality of

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voxels" (Fang, figure 1B; the objects with its 3D grid voxel structure); "representing a 3D object in a first voxel space representation comprising at least a portion of said plurality of voxels" (Fang, object 160; column 11, lines 36-47), and "converting said first representation into a second voxel space representation" (Fang, re-voxelization; column 11, lines 48-67), "said second representation is defined by boundary voxels representing a border of said 3D object, said second representation being exclusive of outer voxels, said outer voxels disposed outside said boundary voxels" (Fang, column 16, lines 6-19, the boundary model for the solid voxel).

Claim 13 adds into claim 12 "the step of compressing said plurality of line segments by eliminating inner voxels of said 3D object, said inner voxels disposed inside said boundary voxels" (Fang, the ray includes only the entering and exiting voxels; column 16, lines 14-19)

As per claim 16, Fang teaches the claimed "system for manipulating a voxel object", comprising: "selecting a voxel grid comprising a plurality of voxels" (Fang, figure 1B; the objects with its 3D grid voxel structure); "structure for representing or receiving a 3D object in a first voxel space representation comprising at least a portion of a plurality of voxels included in a voxel grid" (Fang, object 160; column 11, lines 36-47), and

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"structure for converting said first representation into a second voxel space representation" (Fang, re-voxelization; column 11, lines 48-67), "said second representation is defined by boundary voxels representing a border of said 3D object, said second representation being exclusive of outer voxels, said outer voxels disposed outside said boundary voxels" (Fang, column 16, lines 6-19, the boundary model for the solid voxel).

Claim 17 adds into claim 16 "a matrix of segments including a plurality of spaced apart parallel line segments, each of said plurality of line segments being compressed having no inner voxels of said 3D object, said inner voxels disposed inside said boundary voxels" (Fang, the ray includes only the entering and exiting voxels; column 16, lines 14-19)

Claims 3, 4, 9-11, 14-15, 18-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In claim 3, and similar claim 14, 18, the allowable feature is "each of said plurality of line segments are represented as a pair of integer numbers corresponding to a z-coordinate of said boundary voxels for each non zero voxel of an x-y plane in said first

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representation, said segments having a length corresponding to a distance between said boundary voxels. “

In claim 4, and similar claim 15, the allowable feature is “said matrix of segments has the form  $Archive[x][y], 0 \leq x < W, 0 \leq y < H$ , where  $Archive[i][j] = Line.sub.ij$ . “

In claim 9 and its dependent claims 10-11, the allowable feature is “dynamically modifying an image displayed on said display device, wherein said modifying includes modification of said matrix of segments.”

In claim 19 and its dependent claims 20-23, the allowable feature is “a user controlled voxel brush apparatus communicably connected to said system, said voxel brush for editing of said voxel object on a display device.”


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu K. Nguyen whose telephone number is (571) 272 7645. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (571) 272 7664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Phu K. Nguyen  
August 24, 2006

  
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